National Institute of Environmental Health Sciences

Climatically driven synchrony of gerbil populations allows large-scale plague outbreaks

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Abstract:

In central Asia, the great gerbil (Rhombomys opimus) is the main host for the bacterium Yersinia pestis, the cause of bubonic plague. In order to prevent plague outbreaks, monitoring of the great gerbil has been carried out in Kazakhstan since the late 1940s. We use the resulting data to demonstrate that climate forcing synchronizes the dynamics of gerbils over large geographical areas. As it is known that gerbil densities need to exceed a threshold level for plague to persist, synchrony in gerbil abundance across large geographical areas is likely to be a condition for plague outbreaks at similar large scales. Here, we substantiate this proposition through autoregressive modelling involving the normalized differentiated vegetation index as a forcing covariate. Based upon predicted climate changes, our study suggests that during the next century, plague epizootics may become more frequent in central Asia.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2275183

Resource Description

Early Warning System: ☑

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☑

weather or climate related pathway by which climate change affects health

Ecosystem Changes

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Kazakhstan

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Tick-borne Disease

Tick-borne Disease: Plague

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content